PROBLEM-SOLVING BY CHILDREN IN DAILY NURSERY SCHOOL SITUATIONS

by

GENEVA JOHNSON

B. S., Kansas State College
of Agriculture and Applied Science, 1935

A THESIS

submitted in partial fulfillment of the

requirements for the degree of

MASTER OF SCIENCE

Department of Child Welfare and Euthenics

KANSAS STATE COLLEGE
OF AGRICULTURE AND APPLIED SCIENCE

1941

TABLE OF CONTENTS

INTRODUCTION

Development of the young child is affected by the kinds of problems he meets and the way in which he meets and solves them. Success in meeting and solving difficulties may develop the habit of facing reality and prevent the resort to wishful thinking. According to Lewin (1935) "Only in a sufficiently free life-space in which the child has the possibility of choosing his goals according to his own needs and in which, at the same time, he fully experiences the objectively conditioned difficulties in the attainment of the goal, can a clear level of reality be formed. Only thus can the ability for responsible decision develop." Solving problems may contribute to the child's feeling of adequacy and achievement, now being emphasized as one of the fundamental personality needs. Prescott (1938) stated that contact with reality, harmony with reality, and a fair balance between success and failure were essential to optimum personality development. In nursery schools, teachers try to help children learn to accept both their successes and their failures. If this is true, instances should be found that illustrate how children meet and solve difficulties.

Many studies concerning problem-solving have been done by experimental methods. Kohler (1927) presented experimental problems to apes in which they were obliged to overcome obstacles to reach a goal. Heidbrieder (1928) presented problems to children of different age levels and to adults. Roberts (1929) investi-

gated the ability of preschool children to solve a problem in which a simple principle of relationship was kept constant. Harter (1930) used an obstacle peg test, a canal test, and a pulley test to study problem-solving by nursery school children. Matheson (1931) studied preschool children duplicating Kohler's insight experiments with apes. The influence of certain types of external incentives or rewards upon the performance of a task was observed by Chase (1932). Jack and others (1934) studied (1) pursuing one's own purposes against interference and (2) directing the behavior of one's companions. Lewin (1935) studied the behavior of children when barriers stood in the way of their goals. The behavior of young children in failure was investigated by Keister (1938). Gesell (1940) used a ball on a table, a puzzle box, and a garden maze in studying problem-solving. Gesell also contributed many studies of genetic sequences in children's behavior.

It seems that experimental methods alone have their limitations. Slater, et al, (1939) have stated:

> A nursery school has many yardsticks with which to measure accomplishment and maturity. Although some of these are not susceptible of precise evaluation in relation to norms they are often in surprising accord with most standardized data. Such instruments have the advantage of measuring accomplishment under the stresses and distractions of a social group, that is, under conditions comparable to those under which a child will live and work in actual life situations. Therefore, data obtained through the use of these instruments do not merely parallel findings obtained with better standardized measures of test-room and laboratory, but also deal with

> much the same qualities under possibly more realistic circumstances. A child can respond on a certain level alone with a psychologist; but what can he do as one of the group of children?

Responses in group situations have been studied in nursery schools, especially in relation to social contacts. These studies usually included some problem-solving in social situations. A representative study is that of Jersild and Markey (1935) who recorded conflicts among preschool children in nursery schools. Slater, et al (1939) studied types, levels, and irregularities of response to a nursery school situation of forty children. Performance levels in solving puzzles, building with blocks, using scissors, mastery of buttons, and other skills were studied.

No studies have been found of the nursery school as a setting for problem-solving in general. The nursery school does appear to offer the child a wide choice of suitable materials, opportunities to use them freely, and a group of companions of his own age. It also gives guidance under teachers, one of whose objectives is to encourage independent thinking and problem-solving. It seems therefore, desirable to study the problems met by children in such a setting.

Gesell, et al, (1940) defined problem-solving in this manner: "A situation presents a problem when it arouses a goal to which there is an obstacle. The problem may be solved either by adaptive manipulation, actual or mental, or by insight concerning the nature of the obstacle." Trial and error behavior according to Hilgard and Marquis (1940) proceeds as follows: "The learner tries various movements, apparently somewhat random,

without recognition of connection between the movement and the resolution of the problem situation." In regard to insight, they stated, "The term insight implies a kind of learning in which a conspicuous readjustment occurs in a single trial." The terms, problem-solving, trial and error, and insight, throughout this study, are used with the meanings expressed in the foregoing definitions.

The present study is an exploratory survey of daily situations in a nursery school. It attempts to answer such questions as:

From the child's viewpoint, to what extent do his daily experiences in nursery school present problems to him? What is the nature of these difficulties and of what kinds are they? In what ways do the children attempt to solve their difficulties?

The purposes of this study were therefore: (1) to ascertain the kinds of problem situations experienced by children in the Kansas State College nursery school, and (2) to ascertain the methods used by these children in solving problems.

METHOD OF PROCEDURE

Data were obtained in the Kansas State College nursery school. Kansas State College is a land-grant college located in Manhattan in the agricultural region of Eastern Kansas. Manhattan has a population of 11,000. The nursery school was housed about three blocks from the campus in a large and spacious northern colonial home with fourteen rooms. Four of the rooms were

used as offices and classrooms.

The nursery school served as a laboratory for students majoring in home economics at the college. During the second semester of 1940-1941 ninety undergraduate students participated in the nursery school.

The children were from homes of the college faculty and other professional and business people. For purposes of nursery school administration, the children were divided into three groups, i.e., A, B, and C, chiefly according to age. However, differences and abilities were also taken into consideration. In group A, the more immature group, there were ten children, six girls and four boys, whose ages at the beginning of this study ranged from 2 years, 3 months to 3 years, 4 months. In group B, there were nine children, three girls and six boys, whose ages varied from 3 years, 2 months to 4 years, 3 months. In group C, the more mature group, there were six girls and three boys, whose ages ranged from 4 years, 1 month to 4 years, 8 1/2 months. Group attendance was fairly constant.

Observations were made during the "free play" of the children in the nursery school from 9 to 11:30 a.m. Two of the three groups were observed daily and these two groups were observed for a continuous week. The time for each day was divided equally between the two groups. Groups A and B were observed for eight weeks and group C was observed for seven weeks. However, the week of February 10 was used as a trial week and more problems were observed in group C at that time. One week groups A and B were observed. The next week, B and C, and the third week, C and

A were under observation. Then the original rotation was used until 200 problem situations were obtained. The amounts of time spent in observing the three groups were approximately equal. Records were taken for ten weeks. The nursery school was not in session four days during the time. Routine of the groups was such that observations were not made during a music period, a story period, or any other period when the activities were of a type where problems were not likely to occur.

The observer sat or stood where she could see as many children in the group as was possible at one time. The arrangement of the nursery school was such that part of one group may have been playing in one room and part of the same group may have been elsewhere. Only one problem was recorded at a time although others may have been occurring. Thus the data contain most but not all the problems occurring. Records were made only of situations which seemed to be a problem to the child himself. All problem situations were omitted in which the teachers stepped in without having been asked by the child for help.

An objective description of the problem situation (a narrative record of what the child said and did) was recorded for each problem observed. The diary record of the child was continued until the child solved the problem or until he definitely left the situation. Observations were taken on the playground and in the garage as well as in the different rooms in the house. Each problem situation was recorded on a separate card (Form I, Appendix). Each card contained the date, the letter designating

the group the child was in, the place the incident occurred, and the time of day.

INTERPRETATION OF DATA

After recording the data, a brief summary of the problem was placed at the top of each card (Form I, Appendix) to facilitate sorting. The problems appeared to fall in the following general categories shown in Table 1:

Difficulties related to materials.
Difficulties related to people.
Difficulties in manipulating own body.

The materials included both play materials and any objects the child came in contact with such as doors, clothing, or furniture.

In Table 1, the total percentage of difficulties related to materials was 67.5. Only 29.5 per cent of the 200 problems were difficulties related to people. Six problems or 3 per cent were primarily in manipulating the child's own body. In the latter case, if materials were involved, they were usually stationary. Some of the problems the children encountered in manipulating their own bodies were:

> Jim started down a ladder.---. He slid his feet down trying to hit the rounds with his feet. One foot slipped clear through and he pulled it back and tried again until his foot hit a step. He touched the step with his second foot easily.---.

Table 1. Kinds and number of problems encountered by the total number of children.

	No. of problems	Percentage
Difficulties related to materials		
Materials known to be unfamiliar	5	2.5
Materials familiar		
Difficulties in moving or putting materials where desired	30	15.0
Difficulties in meeting obstacles which stand in the way of the child's goal	16	8.0
Difficulties in picking up objects that are spilled, knocked down or have fallen down	8	4.0
Difficulties in putting objects together or taking them apart	7	3.5
Difficulties in manipulating articles of clothing		
Own clothing	11	5.5
Doll clothing	5	2.5
Difficulties in using raw materials in construction (saws, hammers, nails, boards, scissors, paper, pencils, paste, clay, sand, etc.)	13	6.5
Difficulties in materials themselves (Nature of material--broken, too small, unsuitable or too noisy)	17	8.5
Difficulties with fastenings on doors, latches, etc.	9	4.5
Total (materials familiar)	116	58.0
Place where materials are kept	9	4.5
Choice of materials when offered	5	2.5
Total (difficulties related to materials)	135	67.5
Difficulties related to people		
Getting adult's attention	2	1.0
Influencing a child to do something (Often in relation to materials)	31	15.5
Maintaining property rights	26	13.0
Total (difficulties related to people)	59	29.5
Difficulties in manipulating own body as a whole	6	3.0
Total (problems)	200	100.0

May was climbing on a parallel ladder. She put one foot over the round and was attempting to lift the other one over.---.

Jean climbed up a ladder.---. She put one leg through the space between the rounds of the ladder. Finally she worked her body until she succeeded in getting the other leg through. Then she hung from the top round and let her body down so she could drop through to the ground.---.

Bill had his hands in his pockets and fell down on his stomach. He tried to get up without pulling his hands out from under him. He tried lifting his head and feet at the same time. He said to a teacher standing close by, "Get me up." The teacher replied, "You can get up." He tried again and his hands remained in his pockets under him. He made several grunting noises as he continued to raise his head and feet. He said again, "Help me." The teacher replied, "Try, Bill." This time he rolled over on his side. He pulled one hand out of his pocket and turned until he could get the other hand out. Then with the use of his hands, he was able to get up.

Difficulties related to materials were of four kinds:

Materials known to be unfamiliar.
Materials familiar.
Place where materials were kept.
Choice of materials when offered.

In 58.0 per cent of the cases, the children met difficulties in manipulating materials that were familiar to them. These difficulties were of eight kinds. The one occurring most frequently was that of moving or putting materials where the child wanted them. For example:

> Jim took off his two-piece snow suit and was ready to put it away. He picked up the leggins and turned them around until he had reached the top of them. He then tried to hang them on a hook. He was not successful but repeated this three times until he succeeded in getting the leggins to stay on the hook. Next he picked up the coat by the belt, and pulled on the belt until it came loose from the coat. He dropped the belt on the floor and picked up the coat by the hem. He kept taking hold of different parts of the hem until he got completely across the hem and up the side to a lower buttonhole. He tried to hang the coat on a hook by the

buttonhole. The locker was so full with the leggins that he could not succeed in getting the buttonhole on the hook. He made a second attempt to hang the coat by the buttonhole. When he was not successful, he dropped it on the floor, gathered it up into his arms, and pushed it into the top of his locker. Next he stepped on his belt and tried to pick it up while standing on it. He moved off the belt and gathered it up in his arms, much as he had the coat, and pushed it into the top of the locker with the coat.

Difficulties in the nature of the materials themselves were responsible for 8.5 per cent of the 200 problems. Some of the problems encountered were with the following:

Jean spilled some sand. The brush and dust pan were in the closet. She went over to the closet and tried to open the door. She could not turn the knob and she tried again.---. (The knob was stuck.)

Mary took off her snow suit and started to put it in her locker. She noticed that the piece she usually hung it by was broken.---. She said, "This is broken" and pointed to the piece that was loose.

Paul had a pair of scissors and was trying to cut some paper. The scissors had paste on the blades and would not cut.----.

George was playing with two trucks. He ran them together and the "dump part" of one truck fell off. He sat the dump part back on the truck where it belonged. The piece fell off again.----.

Sue was trying to undress a doll. She removed all the clothes except the cap. It was tied in knots under the chin. She made several attempts but could not budge the knot.---.

Ruth went over to the place where Mike and Chet were sliding down the boards. She picked up the long blue board and put one end on the radiator. Chet said, "You can't use that, the piece (the cleat) underneath's gone." Mike said, "Yeah, and it falls down."

Difficulties in meeting obstacles which stood in the way of a child's goal and difficulties in manipulating articles of clothing each presented 16 problems or 8 per cent. Examples of obstacles were:

Lou and Sue had a rope. One was hanging onto one end and the other to the other end. Most of the slack was on the floor when another child ran over it with a wagon.---. The rope became tangled in the wagon wheels. ---.

Gene was pushing Carl in his wagon and Carl was guiding it. They ran into a hole and Gene couldn't push the wagon out.---.

Sue wanted to take her buggy through the door into the hall. The door was blocked with a doll bed and ironing board. She tried to push the buggy through at the side but there wasn't enough room.---.

Sue was painting boards with a brush and some water. Bill tried toopen the cupboard to get a brush like Sue's. The vise handle was turned over so the supboard door would not open.---.

Doris, Dean, Leo, and Bill were playing with a large box on casters. Doris and Dean were pushing and Leo and Bill were riding. They ran the box into the fence and tried to pull it out sideways. It didn't work. ---.

Problems involved in manipulating clothing included both children's and dolls' clothing:

> Jean unfastened the suspenders of her new skirt and played with them for a few minutes. She then tried to reach the suspenders and pull them over her shoulder. She succeeded in pulling one but she could not button it. She asked an adult for help. The teacher held the suspender while the child buttoned it. Next, the child tried to reach the second suspender and could not. She unbuttoned the first one and her skirt fell down around her hips. She tried to tuck her blouse in but could not. Jean remarked, "I'll take it off and put it over my head." She stepped out of her skirt and put in on over her head. She pulled one suspender over her shoulder and buttoned it. She started working the other suspender over her shoulder and finally buttoned it.

The use of raw materials in construction caused 6.5 per cent of the problems. Saws, hammers, nails, boards, scissors, paper, pencils, paste, clay, and sand are some of the materials that offered problems in construction.

> Ruth was making molds of sand and putting them around the border on the sand pile.

June had been helping her and she left. When another child came up to Ruth and asked her to do something, she said, "No, I don't want to" and "I want to finish this." When another child mussed up one of the sand molds, she brushed it out and put another one in its place. She had worked at the problem about 50 minutes when it was time for group C to go in for orange juice. Ruth said to the teacher, "I want to finish this first." She had the sand molds around the border at least three-fourths of the way. The teacher told her she could finish it but as soon as she finished to come in for orange juice. She finished in 20 more minutes and went in for juice immediately.

Nine problems out of the 200 or 4.5 per cent were difficulties with fastenings such as:

Doris tried to open the trunk with the doll clothes by pushing on the catch and she couldn't.---.

Chet and Mike were trying to open a suitcase. First Chet tried pushing on the catch and then Mike tried.---.

Dean wanted to go in the house to get a Kleenex. He went up to the door and turned the knob slightly and pushed lightly but couldn't open it.---.

Alice came up the stairs and tried to open the gate. She pushed on the lever several times but the gate didn't open.----.

In 4 per cent of the cases a child occupied in building spilled his pegs or blocks or they were knocked down or fell down. This presented a problem to the child which he had to solve in order to continue his building.

Mike spilled a box of pegs that he was using. He exclaimed, "Gosh!" and started to pick them up. He pushed many together and picked them up all at once. He said, "Help me, Chet." And Chet replied, "O.K." He started picking them up and said, "We want these don't we?" Mike replied, "We want all of them." They worked until they had them all picked up and then put the box on the table and started putting the pegs in the board.

In seven out of the 200 problems, putting objects together or taking them apart was difficult for a child.

Leo was trying to take a train apart
and two of the cars were stuck together.----.

The places materials were kept presented a difficulty in 4.5 per cent of the examples. Books were sometimes kept on shelves that were too high for a child to reach. Hammers, saws, and rhythm instruments were other materials that (for various reasons) were kept in places a child could not reach.

Choice of materials and use of unfamiliar materials each had a percentage of 2.5. One of the children in group A was trying to use a paper punch for the first time.

> The teacher left the child and he made an attempt to take hold of the punch as the teacher had shown him. He could not push the handles together so he put the punch down on the table and pushed on the top of the punch with the palm of his hand. Next he hit the punch several times. He crumpled the paper in his hand and continued pushing the punch with the palm of his hand. Finally he threw the punch down on the table and ran over to the gold fish bowl. He climbed on a chair and watched the fish and did not go back to the paper punch.

The foregoing difficulties arose within the child's physical environment. A second type of problem, concerned with social

relationships, amounted to nearly one-third of 29.5 per cent of the problems. It should be remembered that in taking data, all problems were discarded in which a teacher stepped into the situation without being asked by a child since it was desired to study children's methods of solving problems. This 29.5 per cent includes only those problems with persons which the child himself attempted to solve either with or without asking for help. The percentage of social difficulties might have been much greater if the data had not been limited.

Thirty-one problems or 15.5 per cent were those in which the child was trying to influence another child to do something. Often these problems also involved materials but not always. In the following problem, the child's goal was to obtain a wanted object.

> Paul and Sue were sitting at a table by themselves with scissors and paper. Nina wanted Paul's paper butterfly. She said, "I want that one" and tried to take it. Paul replied, "No" and held onto it. Sue started crying, saying, "Paul, I want that one." Paul said, "No, I want it." Sue stopped crying and said, "Here, I'll give you this butterfly and you let me have that one." Paul traded.

In 13 per cent of the difficulties, the child attempted to maintain his own rights.

Leo walked up to May and announced, "I'm going to play with your train." May replied, "No, it's mine."---.

Gay sat down in Leo's chair when he got up to look at a book. He came back and said, "That's mine." She didn't move and he pointed to another chair and said, "You can sit there." Gay sat and smiled at him and Leo got another chair.

In only 2 incidents or 1 per cent of the cases did a child have a problem in trying to get an adult's attention:

Carl and Paul were on top of the playhouse. They made a snowball and threw at one of the teachers who had her back to them. She exclaimed, "Oh, my!" and turned around. Carl explained, "We didn't know whether you were a teacher or not so we threw a snowball at you." The teacher asked, "Am I?" and they replied, "Yes."

It seems according to Table 1, that the children were confronted with many varied difficulties both in their material environment and in their contacts with other children. Adult contacts evidently did not present problems to these children.

In interpreting the results shown in Table 2, since the time spent recording data in each group was approximately the

same, it is possible to compare tendencies in the three groups. Too much significance should not be ascribed to the results since the numbers are small.

Table 2. Summary of the general kinds and numbers of problems encountered by groups A, B, and C.

	Group A		Group B		Group C	
	No. of A's total problems	Percentage	No. of B's total problems	Percentage	No. of C's total problems	Percentage
Difficulties related to materials	36	61.2	42	69.8	57	69.7
Difficulties related to people	19	32.3	17	28.4	23	29.4
Difficulties in manipulating own body	4	6.7	1	1.7	1	1.2
Total	59	100.3	60	100.0	81	100.0

The percentages of problems falling in each of the three categories are similar in all three groups. Group A, composed of the more immature children, met a slightly higher percentage of difficulties in motor coordination or in manipulating their own bodies as might be expected.

The kinds and numbers of methods used in attempting to solve the problems varied greatly and the solutions were scattered into a large number of different categories. A total of 482 attempted solutions was used by the children in handling the problems. A child might use a variety of methods in attempting to solve one problem. (This study did not include any judgment as to the success of the methods used.)

The specific methods used are shown in Table 3. The methods

Table 3. Kinds and numbers of methods used by the total number of children in attempting to solve problems.

	No. of methods	Percentage
Attempted solutions involving materials alone		
Tries different forms of manipulation frequently in a trial and error fashion		
Manipulates material itself with hands:		
Pushes, pulls, reaches	59	12.4
Moves objects out of way, picks up or carries objects	32	6.7
Hits, shakes, pounds, throws, bends or breaks an object	10	2.1
Fits pieces together, or fits material into place or onto objects, or takes materials apart or off of objects	31	6.4
Total (Manipulates material itself with hands)	132	27.6
Manipulates tools		
Uses tools or equipment in manipulating materials (may be sticks for prying or something to stand on or to climb on)	9	1.9
Cuts with scissors, saws, turns vise handle, uses hammer, uses pencils, or molds, etc.	8	1.7
Total (Manipulates tools)	27	5.6
Manipulates body, hands, or feet as in climbing, getting up, or getting out of tight places (Materials if involved are usually stationary)	13	2.5
Exhibits emotion	8	1.7
Gives up solution		
Without trying	0	0.0
After trying	9	1.9
Total (gives up solution)	9	1.9
Total tries different forms of manipulation	189	39.3
Makes a choice when offered	6	1.2
Apparently has insight into cause and remedies it	20	4.1
Total attempted solutions involving materials alone	215	44.6

Table 3. Kinds and numbers of methods used by the total number of children in attempting to solve problems. (Continued)

	No. of methods		Percentage	
Attempted solutions involving persons				
Asks for adult help or states need for help				
Physical help given (verbal help may accompany physical help)	51		10.8	
Only verbal help given	16		3.1	
No help given	2		0.4	
Total (asks for adult help or states need for help)		69		14.3
Asks a child for help				
Given	15		3.1	
Not given	11		2.3	
Total (asks a child for help)		26		5.4
Asks a child to do something or for something		18		3.7
Bribes or threatens		6		1.2
Offers substitute or makes suggestions		12		2.5
Talks to a person and gives reason				
Rational	16		3.7	
Irrational	3		0.3	
Total (talks to a person and gives reason)		19		4.0
Performs acts of aggression				
Physical	11		2.3	
Verbal	2		0.4	
Total (performs acts of aggression)		13		2.7
Holds away from, runs from, or runs after another child		12		2.5
Touches someone or makes a noise to gain attention		5		1.1
Gives a command or forbids		14		2.9
Destroys property to keep another child from getting it		1		0.2

Table 3. Kinds and numbers of methods used by the total number of children in attempting to solve problems. (Continued)

	No. of methods		Percentage	
Gives up solution				
Without trying	0		0.00	
After trying	18		3.7	
Total (gives up problem)		18		3.7
Exhibits emotion				
Cries, shows some form of anger, etc.	10		2.1	
Shows enthusiasm to influence a child	1		0.2	
Total (exhibits emotion)		11		2.3
Claims possession				
Physical	15		3.1	
Verbal	16		3.3	
Total (claims possession)		31		6.4
Total attempted solutions involving people		254		52.9
Solutions given by another child unasked (verbally or physically)				
Partially	9		1.9	
Completely	4		0.6	
Total (solutions given by another child)		13		2.5
Total (solutions attempted)		482		100.0

used in attempting to solve the problems were classified in three general categories:

> Attempted solutions involving materials alone.
>
> Attempted solutions involving persons.
>
> Solutions given by another child unasked (verbally or physically).

Attempted solutions involving materials alone made up 44.6 per cent of the total. The larger part of these (39.2 per cent) consisted of trying different forms of manipulation of the materials frequently in a trial and error fashion. But in 4.1 per cent or 20 of the cases the child apparently had insight into the cause of his difficulty and quickly remedied it. In 6 cases he solved a problem of choosing between materials.

Most of the time the child manipulated the material itself with his hands, and in 27 cases (5.6 per cent) he employed tools with which to manipulate the material. In 13 cases (2.5 per cent) his method was that of manipulating or coordinating his body muscles as a whole, for example:

> Chet was playing close to a large tub. He backed up too far and fell into the tub. He had a surprised look on his face and all the children started laughing so he did too. He was sitting on the bottom of the tub with his feet hanging over the side. He tried to get up by standing and couldn't. He said,

"Help me." Two of the children came over and tried to pull him out. He sat and laughed and so did they. Chet tried again without taking hold of the sides with his hands and didn't succeed. He finally took hold of the side of the tub with his hands and pulled himself up until he sat on the edge of the tub. He was then able to stand up.

Only 8 times in solving difficulties with materials did a child exhibit emotion through crying or showing anger. In only 9 cases he gave up, but always after trying one or several methods.

The total number of attempted solutions involving persons was the largest shown in Table 3 with 254 problems or 52.9 per cent. There were 14 different methods of attempted solutions involving persons as shown in Table 3. (The methods used most frequently by the children are shown in Table 4 and discussed in connection with it.)

The remaining solutions attempted by the children were used less frequently. The child gave a command or forbade another child doing something in 14 cases. In 13 cases he performed acts of aggression. Verbal aggression was used in two cases.

George took part of Carl's train. Carl looked at him and went over and picked up his part of the train and said, "Get away,

you mean German."---.

In the other case, the child used physical and verbal aggression together.

> (Paul wanted a rubber wheel Sue had first.) He said, "I want it." Sue replied, "No, it's my doll's and no one else can play with it." She stepped over a bed away from Paul. She held the wheel over her head. Paul followed her and tried to take the wheel. Sue said in a shrill voice, "No, it's mine. Hold him Jack so he can't get the wheel." Jack grabbed him.---. Sue said, "Hold him so he can't move and I'll step on him." She started to step on him but soon left the group with the rubber tire.

In 12 cases the child offered a substitute or made a suggestion to another child.

> Mike wanted part of Chet's train. Chet didn't want him to have it and said, "There's a tin caboose over there on the shelf." Mike said, "Oh", and put the caboose on his train and the two children started pulling their trains side by side.

The child held an object away from another child, ran from him or ran after him in 12 cases. The children showed emotion in 11

cases. In one case it was in the form of enthusiasm in order to get another child to do something.

> May was trying to find someone to teeter with her. She had asked several and then came up to Jean and asked, "Will you teeter with me?" Jean replied, "No" but started walking toward the teeter. She stopped and started climbing a ladder. May started running and said in a very excited voice, "Come on, let's teeter." She climbed on the teeter and Jean got off the ladder and ran over and got on the teeter.

In other cases of showing emotion the child cried, stamped his foot or screamed at another child. Bribes or threats were used in 6 cases.

> George wanted a car Carl had. He started to take it away from him. Carl ran and George ran after him.---. George said, "Well, I want it." Carl replied, "No, you can't have it." George said, "Well, I'll give you $50 for your racing car." Carl said, "No, I won't trade."---.
>
> Chet and Mike took a board Ruth was playing with.---. Mike asked, "Can we have this, Ruth?" She replied, "No, I'm not

through with it." Chet said, "Ruth, you can play with us if you let us use your board." Ruth said, "Well, all right."

Touching someone or making a noise to gain attention was used by the children in five cases.

> Chet, Mike, and Dean were playing house. Chet and Mike called Dean, who was the doctor, to come over to see if their babies had the mumps. Dean went to the imaginary door and didn't see a good place to knock so he knocked on a cupboard close by. The boys didn't hear him so he came close to the door and knocked on a block. They didn't answer so Dean looked around for another place to knock. He knocked on a wall and they didn't hear him so he said, "Dinga ling, dinga ling." Chet came to the door and said, "Come in doctor."

In only one case did a child destroy property to keep another child from getting it.

> Sue had some blue paper tulips. Patsy said, "Give them to me." She reached for them and Sue held them over her head and said, "Well, Paul gave them to me." Patsy took hold of her arm and started to pull it

> down. Sue worked her arm free and started tearing up the tulips, holding them over her head.---.

In 13 cases another child stepped in unasked and gave the solution. A child sometimes stepped in and helped another child solve the problem even though he was not asked. Sometimes he partially solved the problem as in the following:

> Dean was building a garage with boards and blocks. He put a board on top and the whole thing fell down. Dean started crying but also started building it again. Chet came in and looked at Dean and the garage and moved one block so the building was more firm. Dean put his garage back the way it had been.

At other times the problems were completely solved.

> Nan came back to the clay table after leaving it to go have orange juice. When she came back to the clay table, someone had taken her chair. Nan asked, "Who took my chair?" The teacher said, "You can use this one." Nan replied, "No, that is Ruth's." She went over to Joan and said, "This is my chair" and started to pull on it. The teacher said, "No, that is Joan's for juice."

Chet pointed to an empty chair and said,

"You can have this one, Nan."

The children exhibited emotion only 11 times in solutions involving people, and 8 times in those involving materials. The children gave up more often in their contacts with people than in solutions involving materials.

Table 3 shows then, that over one-half of the attempted solutions were concerned with other people, and almost one-half were related to materials alone. The total number of times (19) that children exhibited emotion was small, as was the total number of times (27) they gave up solving their problems. This indicates that these children tended to meet their difficulties in an active constructive way, and to put effort into solving them.

The wide variety of attempted methods used was noticeable.

Table 4 shows the specific methods used most frequently by the children in attempting to solve their problems. The children, when confronted with a difficulty, tended to use their hands in manipulating objects more frequently than to use other methods. This occurred in 27.7 per cent of the cases. A child often pushed or pulled, moved something, or pounded materials in a trial and error fashion. Many of his difficulties were moving objects either out of his way or to a place where he wanted them. Sometimes he had trouble trying to take things apart or put them together. It is of interest that this method occurred more frequently than asking for help, indicating that these children were beginning to be independent in meeting their difficulties.

Table 4. The specific methods used most frequently by the children in attempting to solve problems.

	Number	Percentage
Manipulates material itself with hands	132	27.7
Asks for adult help or states need for help	69	14.3
Claims possession	31	6.4
Manipulates tools	27	5.6
Asks a child for help	26	5.4
Apparently has insight into cause and remedies it	20	4.1
Talks to a person and gives reason	19	4.0
Asks a child to do something or for something	18	3.7
Gives up solution (in relation to people)	18	3.7
All other methods	122	25.2
Total	482	100.0

However, they did ask for adult help or state their need for help in 14.3 per cent of the cases, the second most frequent method used. Out of the 69 cases in which a child asked for adult help, the adult gave actual physical help 51 times (see Table 3). This was sometimes accompanied by verbal help. Physical help alone:

> Chet and Mike were trying to load a large box on a wagon. They made several attempts and Mike was crying. Chet walked over to a teacher and said, "Will someone please help us put this big box on the wagon?" The teacher walked over and helped him.

Physical and verbal help:

> Dean had tried to open the door and could not.---. He said to another child who was trying to help him, "I'll det a teacher." He went up to a teacher and said, "I tant open de door." The teacher said, "Did you turn the knob and push?" Dean said, "Yes." The teacher added, "Did you push real hard?" Dean replied, "Yes, I tant." The teacher went over to the door with him and told him to climb up on the top step and said, "Turn the knob and push." Dean tried and she helped push it open.

> When May couldn't get one foot over the round of a parallel ladder she said to a teacher, "Help me." The teacher replied, "You can do it - try again." May tried but couldn't and said again, "You help me." The teacher took hold of her foot and helped her get it over.

Occasionally the teacher gave only verbal help.

> Chet was trying to wash the paint off his arm. He rubbed with some soap and then said, "Help me." The teacher didn't notice him and he said in a much louder voice, "Help me somebody." The teacher replied,

"I think you can do it. Soap your arm real well." Chet continued washing and rubbing until he got the paint off.

In only 2 cases no help was given and in one of these cases another child stepped in and gave the solution before the teacher was given a chance. In the other case:

Gene was trying to put a board on two boxes. He looked at a teacher and said, "Come help me." She evidently didn't hear him and he lifted the board alone even though it was quite heavy.

These children, then, tended to ask for adult help in one-seventh of the cases.

The remaining most frequently used methods of solving difficulties fell into many different categories, the next largest being that of claiming possession of property (31 cases). Sometimes this was done physically, sometimes verbally, or both. In the following, physical possession was used:

George took part of Carl's train. Carl looked at him, went over, picked up his part of the train and took it back.

An example of verbal possession used alone was:

Mary was pulling her train and Leo took hold of it. She said, "No, you get

away, it's mine."---.

Both physical and verbal possession was used in this case:

> George started to take Gene's wagon. Gene said, "That's my wagon." George continued to pull on it. Gene left the cake he was making and grabbed the wagon saying, "No, that's mine." George let go.

The children (in 5.6 per cent of the cases) attempted to manipulate tools in solving their problems. The tools were used for prying or perhaps they were pieces of equipment used for climbing. In some cases the tools were scissors, saws, hammers, vise-handles, pencils or molds. Often these attempts were also in a trial and error fashion.

> Chet and Mike were trying to get some small articles out of a box with small openings. Chet picked up a stick and said, "Let me take this stick and see if I can get it out." He tried prying with the stick.---.

> George came out and looked at the snow on the slide. The snow had melted off the top part so George took a shovel and climbed to the top of the slide and slid down as far as the snow and started shoveling off the snow.---.

> The teacher left Gay after showing her how to pound a nail. Gay picked up the hammer and pounded the nail with the side of the hammer.---.
>
> George wanted a drum that was on the top shelf of a cupboard. He brought a chair over and tried to reach it. That wasn't high enough so he climbed on the lower shelf and then put one foot on the next shelf until he was high enough to reach the drum on the top shelf.

In 26 or 5.4 per cent of the cases a child asked another child for help. Help was given in 15 cases.

> Chet and Mike were playing with some blocks and boards. Mike puckered up his face and said, "Chet, help me with this board." Chet said, "Here, I'll put a block under it."---.
>
> In the problem where Paul was trying to get the rubber wheel Sue had, Sue asked another child for help. She said, "Hold him Jack, so he can't get this wheel." Jack grabbed him.---.

In 11 of the cases in which a child asked another child for help,

the child did not give help.

> Chet was trying to get something out of a box with a small opening. He said, "Mike, maybe you could get hold of it." Mike replied, "No, I can't."---.
>
> Joan was trying to carry a heavy tub and said, "Joy, help us." Joy ignored her. Joan said again, "Help, quick." Still Joy ignored her and Joan lifted the tub off the crate that was shoulder high by herself.---.

A child attempted to influence another child by giving reasons in 19 of the cases. Of these, 16 were logical reasons.

> Carl and George were playing with a truck and loading it with wood. Carl said, "I'm the driver." George replied, "No, I'm the driver." Carl explained, "No, I'm the driver cause I have hold of the steering wheel."---.
>
> Sue said to Gene, "Don't sit on the suitcase." Gene asked, "Why?" and Sue replied, "Because we want you to carry something. You can go along behind with a buggy."---.
>
> Chet had tried to get Mike to help him

get something out of a box and Mike had said, "No, I can't." Chet replied, "Try." Mike said, "Well, I did." and Chet added, "But this is a different one."---.

Sue had some blue paper tulips. Patsy said, "Give them to me." She reached for them and Sue held them in her hand over her head explaining, "Well, Paul gave them to me."---.

Doris, Dean, Leo, and Bill were playing with a large box on casters. Doris and Dean were pushing the other two. They ran the box into the fence and tried to pull it out sideways. The box wouldn't push and Bill got out. Doris tried again and then said, "Get out Leo so we can push."---.

June and Nan were both trying to ride on the back of Ruth's tricycle.---. June asked, "Ruth, you want me to ride on the back, don't you?" Ruth said, "Yes." June went up to Nan and said, "See, she wants me to ride."---.

Several of the reasons given were illogical:

Paul was trying to get a rubber wheel

Sue had.---. Sue said, "No, it's my doll's and no one else can play with it."

The children apparently had some insight into the cause of their difficulties and remedied them in 20 cases out of the total of 482. This is a small number but interesting, in contrast to the large amount of trial and error manipulation.

Jack was trying to take Jean for a ride in the wheelbarrow. She wasn't sitting so she was balanced and the wheelbarrow upset. Jack looked a minute and said, "Get in this way Jean." (He had her sit down by the wheel with her feet back by the handles, so that she would be balanced).

Chet and Mike were making slides for themselves by putting the end of long boards on the radiator. The second board they used kept falling down. They looked at it and noticed it didn't have a cleat like the first board. Mike threw it down and said, "Here, we'll get the other board like mine so it won't fall down." The boards had a tendency to slide even then so Chet said, "I know how to fix it." He went over and picked up some big blocks and placed at the end of the board.

Sue wanted to take her buggy through the door into the hall. The door was blocked with a doll bed and ironing board. She tried to push the buggy through at the side and there wasn't room. She tried to lift the buggy over the furniture but couldn't. She said, "I know, I'll go around." She wheeled the buggy into the adjoining room and out the other door into the hall.

Chet and Mike were running on some boards. One of the teachers asked them to stop running and walk so they wouldn't make so much noise. The board had quite a little give so Mike put a block under it and said, "Look, I put the box under it here so it won't make noise."

Chet and Mike were playing with blocks. They started to slide and Mike yelled, "Chet, Chet, help!" Mike held onto them and June said, "I'll help." They fell anyway. June started to build again and they fell. Chet asked, "What's the matter?" He had entered the group when asked. Mike pulled out a lower block that had one edge missing and said, "Here's what's the matter. It's broken." He took the block out and they rebuilt the wall.

> Joan and Dean picked up a tub and tried to get it in a large wooden crate. They put the tub on top of the crate but it wouldn't go through the space left. Joan said, "Joy help us." Joy ignored them and Joan said again, "Help quick." Joy didn't pay any attention to her and Joan lifted the tub off the crate that was shoulder high by herself. She said, "Help, Dean." Dean took hold and they tried to put the tub through the two lower boards on the crate. It was too large. Joan said, "Let's put it back on top." Dean helped lift. They succeeded in getting one end of the tub on the edge of the crate and pushed it over the top. The tub would not go between the boards. Joan tried to turn the tub on end. She said, "Help us quick, Joy. Come quick." Joy came over and they climbed on the second board of the crate. Joan said, "Turn it over." They turned the tub on its side and it fell in. Joan said, "There."

The children asked another child to do something or for something in 18 cases. They gave up the solution to the problem (in relation to people) 18 times.

It seemed that the children attempted to manipulate ma-

terials with their hands as soon as problems confronted them. This method occurred the most frequently. The next method used was that of asking for adult help. Often they asked another child for help. These children were becoming independent but still tended to ask for help. The remaining methods used most frequently occurred a relatively small number of times, varying from 3.7 per cent to 6.4 per cent.

The two most frequently occurring methods, shown in Table 4, those of manipulating material itself with hands and of asking for adult help, are also the most frequent methods used in each of the three groups, according to Table 5.

When analysis is made of the three groups separately, the numbers are small and the results are not too significant, yet in Table 5 several tendencies may be seen. The more immature group, group A, were more concerned with manipulating their whole bodies but this method was not used by groups B and C. Group A was more concerned about property rights, shown in claiming possession 20 times; group B used this method only 10 times, and in group C it did not occur in the five most frequently used methods.

The children in group C, the oldest group, were beginning to see the causes for difficulties. They used language much more frequently in solving problems, for instance, in asking other children for help, and in talking to other children and giving reasons.

Table 5. The specific methods used most frequently by the children in groups A, B, and C, in attempting to solve problems.

	Number	Percentage of each group's total
Group A:		
Manipulates material itself with hands	39	27.2
Asks for adult help or states need for help	23	16.4
Claims possession	20	14.3
Manipulates tools	9	6.3
Manipulates body, hands or feet	7	5.0
All other methods	45	30.8
Total for group A	143	100.0
Group B:		
Manipulates material itself with hands	33	23.5
Asks for adult help or states need for help	20	14.3
Manipulates tools	10	7.1
Claims possession	9	6.5
Talks to a child giving reasons	8	5.7
All other methods	59	42.9
Total for group B	139	100.1
Group C:		
Manipulates material itself with hands	60	29.5
Asks for adult help or states need for help	26	12.8
Asks a child for help	21	10.4
Apparently has insight into cause and remedies it	11	5.4
Asks a child to do something or for something	10	4.9
Talks to a child giving reasons	9	4.5
All other methods	63	32.5
Total for group C	200	100.0

In Table 6, a summary of the general kinds and numbers of methods used by the children in groups A, B, and C, in attempting to solve problems, it is shown that the percentage under the three large categories were almost equal in the three groups. Possibly in group C the children tend to help one another in problems encountered even though not asked for help.

Table 6. Summary of the general kinds and numbers of methods used by the children in groups A, B, and C in attempting to solve problems.

	Group A		Group B		Group C	
	Number of methods	Percentage of A's total	Number of methods	Percentage of B's total	Number of methods	Percentage of C's total
Attempted solutions involving materials alone	66	46.2	62	44.6	87	43.5
Attempted solutions involving people	76	52.4	74	53.2	105	52.5
Solutions given by another child	2	1.6	3	2.2	8	4.0
Total	144	100.2	139	100.0	200	100.0

In other words, when the data (concerning methods related to people or to materials) is analyzed for the three groups, the results are very similar to those obtained when all the children are considered as one group.

SUMMARY OF FINDINGS

1. This study was made to ascertain the kinds of problem situations that were experienced by children in the Kansas State College nursery school during free play and the methods used by these children in solving problems.

2. Data were obtained by the observer in the form of diary records of the problems and the attempted solutions.

3. These children seemed to meet a wide variety of problems in their free play in the nursery school.

4. Approximately two-thirds (67.5 per cent) of the total of 200 problems were related to the materials in the physical environment. Nearly one-third (29.5 per cent) of the problems were related to people. (Problems were omitted in which an adult entered a situation unasked.) A small number (3 per cent) of the problems were the child's difficulties in motor coordination of his body as a whole.

5. The percentages of problems related to people and materials were similar in all three groups.

6. Four hundred eighty-two attempted solutions were used by the children in meeting two hundred problems. In 27 cases the children gave up attempting a solution. In only 18 cases was there evidence of emotion such as crying, screaming, or kicking. In a large majority of the cases the children attempted to solve their difficulties in constructive ways.

7. The two types of solution were: those making use of materials and those making use of people, both children and adults. In a few cases other children stepped in unasked and partially or completely solved the problem. Slightly less than one-half of the solutions involved materials and slightly more than one-half were concerned with other people.

8. Of the specific methods used in trying to solve problems, over one-fourth were attempts to manipulate the material itself with the hands. Approximately one-seventh were centered on adult help. The other solutions were distributed over a wide variety of specific methods and the percentages were too small to be of significance.

9. Of the total 482 attempted solutions, the distribution according to groups was A 143, B 139, and C 200. In comparing the specific methods used most frequently by the children in the three groups, it was found that manipulating the material itself with the hands was first and occurred in approximately one-fourth of the solutions in each group. Asking for adult help was second in well over one-tenth of the cases in all three groups.

10. For group A the types of methods next in quantitative importance to those above were: claiming possession which occurred in approximately 14 per cent of their attempted solutions, manipulating tools which occurred in 6.3 per cent of the cases, and manipulating the body, hands and feet, which occurred in 4.9 per cent of the solutions.

11. The children in group B tended to use a combination of the specific methods used by groups A and C. They manipulated

tools in attempting to solve their problems in 7.1 per cent of the cases. Group B used claiming possession in 6.5 per cent of their total attempted solutions. In 5.7 per cent of the cases they talked to another child giving reasons.

12. The C group tried to solve their problems with the assistance of another child in one-fifth of their solutions. This would indicate that the older children were beginning to understand the meaning of language and to use their understanding in cooperating with the group. In 5.4 per cent of the cases the children had insight into the difficulty and solved the problem accordingly.

13. According to the results this study indicates that these nursery school children had more problems dealing with materials than with people. Probably such is not true since all problems when a teacher or a student teacher entered the situation without being asked by the child, were excluded from the study. Thus the number of difficulties related to people would be lowered.

ACKNOWLEDGMENTS

Appreciation is here expressed to Mrs. Leone Kell, Associate Professor of Child Welfare and Euthenics during this study, and to Dr. Katharine Roy, head of the department for help in final checking of the material.

REFERENCES

Baruch, Dorothy W.
Parents and children go to school. Chicago. Scott, Foresman. 504 p. 1939.

Chase, Louise.
Motivation of young children. Univ. of Iowa Stud. in Child Welf. 5(3): 1-119. 1932.

Gesell, Arnold, et al.
The first five years of life. New York. Harper. 393 p. 1940.

Harter, Genevieve, L.
Overt trial and error in the problem-solving of preschool children. Ped. Sem. and Jour. Genet. Psychol. 38: 361-372.

Heidbrieder, E. F.
Problem-solving in children and adults. Ped. Sem. and Jour. Genet. Psychol. 35: 522-545. 1928.

Hilgard, E. R. and Marquis, D. G.
Conditioning and learning. New York. D. Appleton-Century. 429 p. 1940.

Jack, L. M. et al.
Behavior of the preschool child. Univ. of Iowa Stud. in Child Welf. 9(3): 1-171. 1934.

Jersild, A. T.
Child Psychology. New York. Prentice Hall. 462 p. 1933.

Jersild, A. T. and Markey, F. V.
Conflicts between children. New York. Bureau of Publ. Teachers College, Columbia Univ. 181 p. 1935.

Johnson, Buford J.
Child Psychology. Springfield, Ill. Charles C. Thomas. 439 p. 1932.

Justin, Florence and Snyder, Eunice M.
Directed observation in child development. Boston. Houghton Mifflin. 165 p. 1938.

Keister, M. E.
Behavior of young children in failure. Univ. of Iowa Stud. in Child Welf. 14: 28-82. 1938.

Kohler, Wolfgang.
The mentality of apes. New York. Harcourt Brace. 336 p. 1927.

Lewin, Kurt.
A dynamic theory of personality. New York. McGraw-Hill. 286 p. 1935.

Maier, N. R. F.
Reasoning in children. Jour. Comp. Psychol. 20: 357-366. 1936.

Matheson, Eunice.
A study of problem-solving behavior in preschool children. Child Develop. 2: 242-262. 1931.

Moore, Elizabeth S.
The development of mental health in a group of young children. Univ. of Iowa Stud. in Child Welf. 4(6): 1-128. 1936.

Prescott, Daniel A. (ed.)
Emotion and the educative process. Washington, D. C. American Council on Education. 323 p. 1938.

Roberts, Katharine Elliot.
The ability of preschool children to solve problems in which a simple principle of relationship is kept constant. Ped. Sem. and Jour. Genet. Psychol. 40: 118-135. 1932.

Slater, Eleanor, et al.
Types, levels, and irregularities of response to a nursery school of forty children observed. Washington, D. C. National Research Council. 148 p. 1939.

Stoddard, George D. and Wellman, Beth L.
Child Psychology. New York. Macmillan. 419 p. 1934.

APPENDIX

(Form I)

Date	Age Group:	Place:	Time:
	Problem in brief:		
	Solution in brief:		
	Narrative description of incident:		